USSR Report

HUMAN RESOURCES

No. 5

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Contents

KOSTIN DISCUSSES STRENGTHENING LABOR DISCIPLINE

Moscow KHOZYAYSTVO I PRAVO in Russian No 3, Mar 80 pp 26-31

[Article by L. Kostin, First Deputy Chairman, USSR State Committee for Labor
and Social Problems]

[Text] The Soviet people are implementing decisions of the 25th CPSU
Congress with stubborn, creative labor. Graphic confirmation of this
can be found in a report from the USSR State Statistical Administration
on the results of the state plan for our country's economic and social de-
velopment in 1979. The figures show that further growth of the economy, a
rise in the people's material and cultural standard of living, and reinforce-
ment of the country's defense capabilities have been insured.

However, the achieved successes cannot and must not cause us to lose sight
of the unsolved problems and shortcomings. The task is to find--efficiently
but, concurrently, with sufficient care and without excessive haste--and
eliminate the causes responsible for the negative phenomena. This is what
V. I. Lenin, the founder of the party and state, taught us.

A deep, critical analysis of both the successes and the accumulated ex-
perience on one hand and the unique features of the shortcomings and the
causes generating them on the other would help us find a way to correct
mistakes and concentrate the efforts and initiative of the masses upon
problems requiring their solution. This is precisely what is asked of
party and economic organs by decisions of the November (1979) Plenum of
the CPSU Central Committee and by recently adopted legislation.

Important among the latter are Decree No 1117 of the CPSU Central Committee,
the USSR Council of Ministers, and the AUCCTU dated 13 December 1979, "On
Further Reinforcement of Labor Discipline and Reduction of Personnel Turnover
in the National Economy,"* ukazes published by the Presidium of the USSR
Supreme Soviet on 7 January 1980--"On Increasing the Amount of the Addition
to the Old-Age Pension for Continuous Service at a Single Enterprise, Insti-
tution, or Organization" and "On Amendment of Article 16 of the Fundamental

* Referred to subsequently as the decree.

1

Principles of USSR and Union Republic Labor Legislation," and Decree No 17
of the USSR Council of Ministers dated 7 January 1980, "On Amending the
Statute on the Order of Awarding and Paying State Pensions."

As production becomes more intense, as scientific-technical progress develops,
and as business ties become broader and more complex, the significance of
strictly observing state, planning, contract, and labor discipline is
growing more and more. "The acuity of this issue can be explained not by
the fact that discipline has become worse," said Comrade L. I. Brezhnev at
the 16th Trade Union Congress. "Generally speaking, this is not the situation.
But we cannot ignore the new requirements being imposed by new technology, by
the growing mutual dependence among sectors and production operations, and by
the entire modern countenance of our economy."

Adoption of the decree was preceded by comprehensive discussion of problems
associated with strengthening discipline and fighting personnel turnover in
the press, radio, and television, at workers' meetings, and in scientific
institutions. Together with the participation of scientists and representa-
tives from social organizations, competent organs deeply analyzed the state
of labor discipline and personnel turnover at the enterprises. The experience
of labor collectives that achieved the best results in productive activities,
in strengthening labor discipline, and in reducing personnel turnover on the
basis of integrated plans of economic and social development was analyzed and
generalized.

In recent years the labor discipline situation has improved, losses of working
time have been decreased, and personnel turnover has been reduced due to
achievement of a higher technical level in production, growth in wages, im-
provement of working conditions, and improvement of the forms and methods of
organizational work and political indoctrination of the laborers. In 8 years
(from 1971 to 1978) personnel turnover dropped by 14 percent in industry and
20 percent in construction. During this period the known losses of working
time dropped, on average per worker, from 2.9 to 1.7 days per year in in-
dustry and from 4.1 to 2.7 days per year in construction.

Inspections conducted in 1979 by organs of the USSR State Committee for Labor
and Social Problems locally as a means for checking out the use of the work
force established that the losses of working time decreased by 20-30 percent
during the year at some enterprises and organizations that had been inspected
earlier.

At the same time the harm done to the national economy by violations of
labor discipline and losses of working time is still rather great. A loss
of just 1 percent of the working time in industry would be equivalent to re-
ducing production by more than 6 billion rubles.

We naturally cannot reduce strengthening labor discipline down to just making
more-sensible use of working time and reducing its losses. Socialist,
conscious labor discipline presupposes conscientious, creative, highly pro-
ductive labor, high quality of the products produced, and satisfaction of
established norms and planning assignments.

It is noted in the decree that the most important task today is to significantly improve organizational work and political indoctrination aimed at strengthening labor discipline, eliminating losses of working time in production, making sensible use of labor resources, and forming stable labor collectives. This work must be viewed as one of the main directions in implementing the party's economic and social policy, raising the effectiveness of production and the quality of the work, and nurturing a communist attitude toward labor.

Labor discipline and personnel turnover, an analysis of data from a large number of surveys would show, depend on a number of factors. This is why the measures foreseen by the decree are integrated in nature. What I mean is that the planned measures will be implemented in close unity with measures foreseen by the recently adopted CPSU Central Committee and USSR Council of Ministers decree "On Improving Planning and Intensifying the Influence of the Economic Mechanism Upon Raising Production Efficiency and Work Quality" and the CPSU Central Committee decrees "On Further Improvement of Ideological and Political Indoctrination" and "On Improving the Work of Preserving Law and Order and Intensifying the Fight Against Crime."

The decree presupposes strengthening the unity of actions by party, soviet, and business organs and by trade union and Komsomol organizations in their efforts at strengthening labor discipline and reducing personnel turnover, and raising the responsibility of business executives, to include the chiefs of shops and sections, foremen, and team leaders, for the state of labor discipline and for compliance with the rules of internal order and other norms of labor legislation. The intention is to gain the broad participation of labor collectives in the work of strengthening labor discipline.

The decree establishes that when we evaluate the activities of an enterprise and its individual organs, and when we summarize the results of socialist competition, and award and confirm the "collective of communist labor" title, we must consider the labor discipline indicators together with all of the basic work indicators.

If we are to create stable collectives and reduce losses of working time, it would be important for us to improve working conditions and dramatically reduce the amount of manual and especially heavy physical labor. The decree foresees developing and implementing integrated programs for reducing manual labor and improving its conditions in relation to individual republics, krays, and oblasts, recruiting internal resources broadly for these purposes.

Presently the proportion of laborers still doing manual labor is unjustifiably great, and it is decreasing too slowly. This problem has acquired very important social significance, since it is becoming more and more difficult to recruit manpower for jobs involving manual and especially heavy physical labor, considering the higher level of general education and the greater cultural and technical level of the laborers. When developing and implementing integrated programs for reducing manual labor, it would be important to capitalize on the experience of the Latvian SSR and Zaporozhskaya, Kuybyshevskaya, and Chelyabinskaya oblasts.

The decree foresees, as a means for improving the use of labor resources, measures by which to raise the effectiveness of the organizational forms of distributing and redistributing manpower, to develop the network of public employment offices, and to improve their activity.

Personnel turnover varies significantly in both the sectors and the individual enterprises. Sometimes it happens that these indicators differ by 1.5-2 times and more at enterprises of the same sector enjoying similar working conditions and nature of production, and having approximately identical average wages.

Thus personnel turnover was 13.2 percent during the year at the Sverdlovsk Uralmash Production Association, while turnover at the Uralelektrotyazhmash Association, located in the same place, was 20.2 percent. This is associated to a significant extent with the fact that each year, Uralmash develops and implements a complex of measures aimed at reducing personnel turnover: creation of favorable conditions for the work, life, and rest of the laborers, reinforcement of labor discipline and control of crime, indoctrination, development of sponsorship, worker qualification upgrading, and so on. Extensive development of the team form for organizing labor, which embraces more than 52 percent of the workers in the association, also played a major role in solving these problems.

The statistical data and the results of a number of studies show that about two-thirds of those quitting their jobs at their own discretion are young people up to 29 years old, and three-fourths of those quitting have accumulated a total work time of less than 3 years. In this connection the decree foresees measures aimed at intensifying attention toward young workers, especially those in production for the first time. A system of career and skill advancement must be broadly introduced on the basis of the experience of the Volga Motor Vehicle Plant imeni 50-Letiye SSSR and other leading enterprises, and measures aimed at developing the sponsorship movement must be implemented; establishing the "Distinguished Sponsor of the Young" title in the union republics is recommended in this regard.

Deserving of attention in this respect is the experience of the Dneprovsk Machine Building Plant, which has been using, since 1972, an integrated system for keeping personnel (especially the young) at their jobs, to include career orientation for young people going to sponsored schools as well as graduates of vocational-technical schools (through the given enterprise's apprenticeship system, and introduction of sponsorship), occupational selection, and adaptation of young workers to production. Introduction of the system, in addition to other measures aimed at reducing turnover, reduced turnover down to 5-6 percent in recent years.

Personnel turnover and labor discipline are inseparably associated with making more-sensible use of working time and reducing its losses. Unfortunately, however, the way many enterprises account for working time does not satisfy the requirements. The accountability reports usually consider only the paid

losses of working time. Periods of idleness occurring within shifts at the fault of the workers are not recorded in most cases. As a rule the accountability reports do not reflect short-term losses of working time caused by organizational and technical shortcomings either.

We cannot adequately fight losses of working time without knowing their true extent or the causes behind them. Therefore it would be suitable to organize--at all levels, from the shop to the association's administrative machinery--a system for accounting working time and its losses based on regularly conducted time-and-motion studies.

Inspections have shown that many losses of working time within shifts are caused by interruptions in the supply of raw materials, by shortcomings in operational and production planning, by disagreements in the production schedules of individual shops and sections, and by absence of scientific organization of labor at the workplaces.

One-third of the losses of working time occurring within shifts are elicited by equipment failures and by unplanned repairs and adjustments, which stem from a low level of work organization, a poor repair base, and a shortage of qualified repairmen. Unsatisfactory dining organization and poor control, by the administration and social organizations, of compliance with the established times for starting and ending work, as well as breaks, are also having a significant influence upon the losses of working time in some places.

If we are to reduce losses of working time and strengthen labor discipline, we would have to implement measures to convert to collective forms of labor organization. In 5 years, personnel turnover decreased from 11 to 5 percent at the Kaluga Turbine Plant, which was one of the first in the country to introduce the team form of labor organization, and the mean annual growth of labor productivity was 9.5 percent.

The leading associations and enterprises are now starting a new phase in development of the team [brigade] form of organizing and paying the labor of the workers, where the team form not only embraces individual sections of the production operation but is also becoming the basis for the entire enterprise's activity. Team organization is combined with growth in the technical level of production, improvement of the planning and control system, and introduction of progressive, technically grounded norms.

A large number of sectors have accumulated experience in developing team and other collective forms of labor organization. Thus, working jointly with the central committee of the trade unions representing workers in heavy machine building, the Ministry of Heavy and Transport Machine Building is now establishing assignments for introducing progressive forms of labor organization at the associations and enterprises, it is maintaining surveillance over completion of the assignments, it periodically examines problems associated with developing and improving the team form of labor organization at joint meetings of the governing board and the presidium of the trade union central committee, and it is providing the necessary assistance to the associations and enterprises.

At the same time there are serious shortcomings in development of the team form of labor organization and wages. Team labor organization has been introduced into just a few production sectors at many enterprises of the Ministry of Electrical Equipment Industry, Ministry of Machine Building for Light and Food Industry and Household Appliances, Ministry of Machine Tool and Tool Building Industry, and Ministry of Tractor and Agricultural Machine Building. Teams are often organized hurriedly without adequate organizational and technical preparation. Many business managers and trade union committees approach development of the team form of labor organization formally, they fail to create the conditions the teams would require for highly productive work, and they do not devote enough attention to indoctrination, to selection and placement of team leaders, to raising the qualifications of the laborers, and to teaching them associated occupations. In a number of cases wages are not differentiated in the teams.

It is important to increase the activity of production team councils and team leader councils examining problems associated with organizing production, strengthening labor discipline, and accepting and dismissing workers, to systematically provide the necessary help to the teams, and insure strict compliance with the norms of labor legislation.

Introduction of scientific organization of labor and improvement of its standardization and payment play a certain role in strengthening labor discipline and reducing personnel turnover.

In this connection the decree foresees upgrading the quality of labor standardization and intensifying the surveillance over the application of the existing wage and work standards conditions, particularly over introduction of the norms of "equal workloads" in different sections and jobs characterized by approximately the same level of intensity, labor organization, and equipment availability, so as to prevent discrepancies between the worker's work contribution and his wages.

The decree foresees an entire series of privileges for those who work conscienciously, as well as a complex of sanctions to be imposed against production disorganizers, idlers, drunkards, and absentees, and a broad spectrum of moral and material influences upon the labor collective and the administration. Thus in order to improve the housing conditions of the personnel, enterprise executives have been given the right to allocate incentive funds to be used as free material assistance and for partial payment of bank loans for cooperative and individual housing construction to laborers who had worked in associations, enterprises, and organizations for not less than 5 years, and to young people who have worked not less than 2 years. Such payments are to be made on coordination with the trade union committee and with a consideration for recommendations of the labor collectives. However, if a worker quits on his own without extenuating circumstances, or is dismissed for violating labor discipline, these assets must be returned to the enterprises and organizations within a time period of up to 5 years.

Laborers and office workers employed in the principal and auxiliary production operations of associations, enterprises, and organizations, and enjoying an annual leave of 15 work days, will be given the right to an additional leave in the 11th Five-Year Plan. Its duration will depend on the time of continuous work: one day for the first 3 years of work, and 1 day for every 2 years thereafter, but not more than 3 days. The period of service entitling the worker to an additional leave is reckoned from 1 January 1980, but the additional leave may be completely or partially withheld in the particular year for absences without extenuating circumstances (to include showing up for work drunk).

Until recently, it has occasionally been the practice to award, with the silent consent of the administration, unpaid leaves, often back-dated to compensate for absenteeism by some violators of labor discipline. Today, such leaves may be granted only with the permission of the director of the association, enterprise, organization, or production unit, and they must be granted by the appropriate order (instructions), published beforehand.

As of 1 January 1983 the amount of the addition to the old-age pension for continuous work is to be increased from 10 to 20 percent for laborers and office workers who served not less than 25 years, and for women having children who served not less than 20 years, if they are concurrently entitled to an addition to the pension for their total time of service. In this case the addition of within 10 percent of the pension is computed above and beyond the maximum amount of the pension.

Among the measures aimed at reducing personnel turnover, we should also note the following: Beginning January of the present year, a laborer who breaks a labor contract at his own discretion is obligated to inform the administration of his actions 1 month beforehand. Paragraph 16 of the decree establishes that if a laborer voluntarily quits his job without extenuating circumstances repeatedly in a calendar year, that year is no longer reckoned in his total time of continuous service.

It should be noted that certain labor losses experienced by the enterprises are associated with meetings, conferences, seminars, rallies, sports competitions, amateur art reviews, and other functions conducted during working time. Business managers, professional unions, and other public organizations must establish strict order in this regard and prevent distraction of laborers and office workers for various sorts of functions not associated with their production activity.

The decree notes that considerable labor losses and violations of the normal rhythm of an enterprise's work are the result of the practice broadly accepted among local agencies for groundlessly taking people from the enterprises and institutions for harvesting, for jobs in procurement organizations, for construction, for area improvement programs, and for other sorts of jobs. Naturally, agriculture will continue to have such a need. But it would be expedient to insure greater organization and effectiveness in the use of

laborers and office workers in agricultural operations. Obviously we must have contracts that establish the rights and responsibilities of the enterprises and organizations that supply and use the manpower, and we must intensify the khozraschet relationships between them. The appropriate recommendations are presently being prepared in this regard.

Another source of unsensible use of manpower involves significant losses of time commuting from home to work and back. The decree orders business managers and the executive committees of local soviets to erect an enterprise's housing pool as close as possible to the enterprise. The work of urban transport must be improved in every possible way as well. Thus attention was turned at the Leningrad Optico-Mechanical Association imeni V. I. Lenin to the fact that many workers in the night shift were quitting work early, and that they were cleaning up their workplaces before the end of the shift so that they could leave the shop sooner so as not to be late getting their urban transportation or suburban trains. At the firm's request the transportation schedule was reorganized, after which the working time losses dropped significantly.

If we are to strengthen labor discipline and reduce personnel turnover, we would have to implement a broad complex of economic, legal, and social measures, and do a great deal of organizational work. Great in this respect is the role of every lawyer working in the national economy. Active, creative use of the legal means for strengthening labor discipline, creating stable production collectives, and doing away with the atmosphere of irresponsibility and condonement are a guarantee of success.

Comrade L. I. Brezhnev emphasized that we need not only words about discipline and appeals for order, "but mainly meticulous, daily organizational work, effective inspection of the work done, and a flexible, well-conceived personnel policy. We must react efficiently and sharply to manifestations of mismanagement and to violations of established plans, rules, and norms."*

Completion of the tasks posed by the decree and by other standard-setting documents adopted on its basis will promote further development of the socialist economy, improvement of its effectiveness, and elevation of the material and cultural standard of living of the people.

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* KOMMUNIST, No 17, 1979, p 17.

11004
CSO: 1828

LABOR

USE OF LABOR IN AGRICULTURAL SECTOR OUTLINED

Moscow KHOZYAYSTVO I PRAVO in Russian No 3 Mar 80 pp 38-41

[Article by E. Monkyavichyus, Senior Scientific Associate at the Lithuanian Scientific Research Institute of the Economics of Agriculture, Candidate in Juridical Sciences: "The Use of Labor Resources in Agriculture"]

[Text] Under our conditions the task of making efficient use of the existing labor resources in agricultural enterprises is especially important. Such demands are also contained in the decree of the CC CPSU, USSR Council of Ministers, and the All-Union Central Council of Trade Unions "On a Further Strengthening of Labor Discipline and a Reduction of Labor Turnover in the Economy." It is stated in it, in particular, that economic executives have to ensure a clear regulation of the rights and duties of each worker and achieve an absolute and high-quality performance by them of their production functions and official duties, and also the elimination of losses of working time, an efficient use of labor resources, and the formation of stable labor collectives. The question arises: How! Practice has suggested several ways.

1. The Specialization of Agricultural Labor

The kolkhoz charters and the regulations on agricultural enterprises record the rights and duties of farms with regard to introducing the most progressive new forms of labor organization in relation to local conditions, economic possibilities, and the level of the mechanization of production and of production technology. Guiding themselves by these norms, the kolkhozes, sovkhozes, and other agricultural enterprises and organizations carry out a deep division of labor among the branches of cropping and animal husbandry and specialize individual labor processes in them. The specialization of agricultural labor can be subdivided into intrafarm and interfarm specialization. With intrafarm specialization the teams, sectors, departments, and other production subdivisions which had been created according to the territorial principle are eliminated or changed.

Until recently in the Lithuanian SSR (as in the other union republics) the basic form of the organization of labor was the constant production team which was created to carry out a complex of diverse agricultural operations on a territory assigned to it. However, in the process of the intensification of agricultural production the territorial multibranch production subdivisions which existed became a brake upon further development. For this reason, in place of them, specialized production subdividions began to be created in accordance with the branch principle: cropping, animal husbandry, mechanization, construction, and others. Here, multibranch production in the farm as a whole was preserved, except that it was concentrated in specialized subdivisions which, as a rule, are led by chief specialists in the branch. The advantage of this form of the organization of labor over the territorial one consists above all in the fact that the production of a homogeneous agricultural output is concentrated in branch subdivisons, which makes it possible to specialize labor more distinctly. The annual economic effect of this per farm in the republic comes to an average of 36,400 rubles.

With the interfarm cooperation and agro-industrial integration of agricultural production the highest level of the specialization of labor is reached. Under these conditions farms have the possibility of not engaging in multibranch production and of specializing more narrowly in the production of individual types of agricultural output. This form of the organization of production and labor, since it is the most auspicious, will continue to develop in the future, which follows from the decrees of the June (1976) and July (1978) Plenums of the CC CPSU.

As with intrafarm specialization, with interfarm specialization labor processes are carried out in branch production subdivisions. And in these subdivisions all of the possibilities are created for a more rational and efficient use of labor resources which is confirmed by the experience of many farms in the Lithuanian SSR. Thus, the kolkhozes imeni S. Neris in Ukmergskiy Rayon and imeni "Pakelta Velyena" in Kedaynskiy Rayon and the sovkhozes "Girdzhyzy" in Yurbarkskiy Rayon and "Giyedraychyay" in Moletskiy Rayon and others, thanks to the specialization of labor in field work, animal husbandry, and mechanization, have fully provided themselves with their own labor resources for which previously they had had an acute need. Moreover, this made it possible to free some of the labor resources from labor intensive work in field work and assign them to the sphere of services and to other subdivisions.

2. The Concretization of the Labor Functions of Workers

This legal measure ensures the maximum use of a worker within his profession, speciality, or qualifications during the entire course of his working time, helps to compensate for the deficit of qualified cadres, and improves the use of the labor resources of the economy as a whole.

The labor function of a worker is usually understood to be the performance by him of his labor duties within his profession, specialty, or qualifications. The right of agricultural enterprises and organizations to delimit and concretize the labor functions of their workers is fixed in the USSR Labor Laws, and also in their charters.

The concretization of the labor functions of workers and kolkhoz workers is performed by means of fixing their wage rates and awarding them qualification categories. Favorable experience has developed in this area in the Lithuanian SSR and also in certain other union republics. Thus, on the kolkhozes "Primin" in Shyaulyayskiy Rayon and "Uzhlekne" and "Ush Tayka" in Mazheykekiy Rayon, depending upon the experience, ability to work, vocational training, and other individual qualities of the kolkhoz workers, six to eight qualification categories are awarded to them. The least difficult demands are made upon the first and most difficult on the last qualification categories. In this way, the farms acurately define and concretize the labor functions of the workers of each qualification category within a profession or specialty. The problem of the performance of auxiliary work was also solved to a certain degree. On the basis of the availability of labor resources, individual highly qualified workers were freed from auxiliary work which was then given to workers of a lower qualification category. The labor functions of the workers are concretized in the wage rate handbooks for agricultural work and in other local legal documents.

As for the labor functions of managerial personnel and farm specialists, they are usually delimited and concretized in the job instructions (regulations) which are adopted and approved on every farm. Incidentally, let us note that the farms need to have substantial methodological assistance in the careful working out of the job instructions (regulations), since on some of them the labor functions of the workers in the above professions are not delimited and concretized and are sometimes duplicated, which is impermissible under the conditions of the specialization of agricultural labor; sometimes certain workers are not used in their function, and this leads to a deficit of qualified cadres.

3. The Combination of the Labor Functions of Workers

A shortage of workers in certain specialities is made up for on the basis of other specialities by means of the combination of labor functions. The combination of labor functions is usually understood to be the kind of combining of labor duties in which along with work in a basic speciality or job additional work is performed in another speciality or job. The right of agricultural enterprises to permit their workers to combine labor functions is established by the current legislation.

11

On farms in Anikshyayskiy, Akmyanskiy, Ionavskiy, Kaunasskiy, and other rayons there are only 90 mechanization specialists per 100 tractors. With each passing year the amount of the agriculture equipment being delivered has been increasing. For this reason, it is necessary to combine related occupations in order to take care of it: tractor operator-machinist, truck driver and mechanic, lathe operator and electrician, and so forth. Under these conditions farms have the possibility of making maximum use of existing labor resources.

On farms which have introduced the specialization of agricultural labor there exists an experience which merits consideration of combining the jobs of managerial personnel and specialists. Thus, the chief of the motor vehicle and tractor pool performs the duty of the chief of the garage and of the tractor team leader. Certain farms have combined the duties of motor vehicle and tractor dispatcher and fueler, the field team leader and agronomist, the bookkeeper and the agronomist, and so forth. An additional payment of up to 30 percent of salary on the basis of the wage fund economy received from reducing the team leader jobs is made to specialists who combine team leader jobs.

However, it seems to us that the combination of labor functions is a temporary measure which has been brought about by the natural and climatic conditions of agricultural production, the seasonal nature of the use of labor resources and equipment, and an insufficiency of labor power. As the mechanization and automation of agricultural production takes place and as labor organization is improved the necessity for the combination of individual labor functions, I would think, would gradually be obviated.

4. The Movement of a Worker to Another Job

The efficient use of the labor resources of farms is directly connected with the spatial movement of workers to other jobs. In contrast to the transfer to other work which is known to USSR labor law, the movement of a worker to another job in the same enterprise is possible without his agreement, if his job, speciality, qualifications, the amount of his wages, his benefits, and other important conditions of the labor contract are not changed. By means of the movement of a worker to another job a farm has the possibility of compensating for a shortage of workers in certain production subdivisions with workers from other subdivisions and of achieving an optimal distribution of labor resources among them.

With interfarm cooperation and agro-industrial integration the question of moving workers outside of a farm arises. The necessity for such a movement arises by virtue of the commitments of a concrete farm which are connected with its voluntary participation of interfarm and agro-industrial associations which require the cooperation of material and technical resources and labor resources.

A definite practice of moving workers to other farms for the purpose of cooperation in material and labor resources has developed on individual farms in the Lithuanian SSR. For example, for the time of the spring sowing or the harvest and in order to jointly perform urgent field work and in accordance with contracts which have been concluded, certain farms assign agriculture equipment, mechanization specialists, and auxiliary labor power to others. All of the basic terms of the labor contract are observed here. The cooperation of farms on the basis of interfarm cooperation solves the problem of a deficit in mechanization specialists and labor power during periods of intense agricultural work.

However, cases of this kind of movement have to be agreed upon with the worker when he is hired. Then the movement of a worker without his agreement is possible. If at the time of hiring there was no such agreement, the movement of a worker to work in another locality has to be performed only with his agreement. The gap in the legal regulations which exist in this case has to be filled by means of legislative work.

2959
CSO: 1828

BRIEFS

MEASURES ON PENSION BENEFITS--Moscow wants to prevent the high fluctuation within Soviet industry. Workers changing their jobs twice a year without compelling reasons must now take into account a reduction in their pension benefits. A party and government decision published in Moscow in January stipulates that in the above case "an interruption of gainful employment" has occurred. In fact, this means that pension benefits accrued up to that time will be voided. New benefits will be calculated after that time. The effect of this decision is unclear, since usually young people transfer from enterprise to enterprise, and they care little about future retirement benefits. According to the new decision notices about resignation from indefinite work contracts will be exempted, if the management of the enterprise receives written notice of the intention to quit 1 month before the effective date. The right of management to terminate without advance notice will remain in full force, however. [Text] [Bonn DIE WIRTSCHAFT DES OSTBLOCKS in German 14 Feb 80 p 2] 9240

CSO: 1826

DEMOGRAPHY

METHODS USED IN COMPILING CENSUS RESULTS DISCUSSED

Moscow VESTNIK STATISTIKI in Russian No 3, Mar 80 pp 19-31

[Article by A. Raykh and A. Volkov: "Method of Amplifying Sample Data of
the All-Union Population Census"]

[Text] The sample study method is being applied more extensively in various
branches of statistics with every passing year. It is efficient in that it
affords an opportunity of obtaining more information with the same expendi-
ture of time and resources or the same information with less expenditure.
All this makes the sample method a useful instrument of statistical research.

The 1979 All-Union Census was the second Soviet population census in which
the answers to some of the questions of its program were obtained by sample.
As is known, for 5 of the 16 questions of the census program (concerning
place of work, occupation, social group, length of residence in a given
population center and the number of offspring) answers were obtained not
from all those polled but only from the permanent residents at the time of
the census of every fourth residence. Application of the sample method in
the 1979 census enabled us to obtain detailed characteristics of the composi-
tion of the population in a shorter time.

The experience of previous population censuses and surveys, particularly
the 1970 All-Union Population Census, when this method was employed to ex-
pand the program of inquiry for the first time,* was of great importance for
the correct organization of the application of the sample method in the
1979 All-Union Population Census.

A number of experimental calculations of sampling error with different sam-
pling methods and a different subdivision of the groupings was made 'in the
period of preparations for the 1979 All-Union Popluation Census. The sampling

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*A. Gavrilov (A. G. Volkov), "Employment of the Sample Method in the 1970
All-Union Population Census," VESTNIK STATISTIKI No 12, 1969.

pattern was tested in the trial census in November 1976. Finally, questions of application of the sample method in the census were discussed in detail at the 1977 All-Union Statisticians' Conference.*

Sampling Procedure and Volume of the Sample

There are three essential conditions for the sample data on the composition of the population to be reliable: the sampling must be unpremeditated, the volume of the sample sufficiently large and the method of amplifying the sample data to the entire population sufficiently complete.

Fulfillment of the first condition in the 1979 census was secured by a well-conceived organization of the sampling which ruled out interference on the part of the census personnel. Every fourth counted residence within the bounds of the instructor's sector was selected from the tellers' notebooks. To remove the influence of possible periodicity in the location of the residences in the counting sectors the start of the sample from the instructors' sectors was alternated: in each instructor's sector designated No 1 the counting off of every fourth residence began with the first sequential residence, in each instructor's sector designated No 2 with the second, No 3 with the third, No 4 with the fourth, No 5 with the first again and so forth. The tellers and the instructor-supervisors were obliged to observe the specified start of the sample and the procedure for counting off the residences. Observance of the condition of the unpremeditated nature of the sample was hereby achieved. Thus a so-called systematic sample was applied which insured for each residence an equal probability of being included in the sample and the even spread of the selected residences on the territory of the counting sectors.

An important advantage of this sampling method is its simplicity. Hundreds of thousands of people were enlisted in the 1979 population census who, although trained to conduct it, for the most part lacked experience of statistical work. For this reason the sampling method had to be simple and insure observance of the demands of sample-method theory. The sampling method employed in the census corresponded to these conditions.

The correspondence of the actual proportion of the sample with that scheduled serves as an indirect indicator of the quality of the sample. With infringements of the procedure of the sampling or irregularities in its pattern, the relationship of the number of selected residences to the total of residences on a given territory (and, correspondingly, the relationship of the numbers of residents) would have differed markedly from the 25 percent. As the results of the 1970 All-Union Population Census, in which an analogous sampling procedure was adopted, and also the results of a number

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*See "Sovershenstvovaniye gosudarstvennoy statistiki na sovremennom etape. Materialy Vsesoyuznogo soveshchaniya statistikov" [Improvement of State Statistics at the Current Stage. Material of the All-Union Statisticians' Conference), Moscow, Statistika, 1979.

of experimental checks, during the 1976 trial census also, showed, the actual proportion of the sample was sufficiently close to that scheduled, which further confirms the efficiency of the sampling method employed.

As far as the second of the above-mentioned conditions--volume of the sample --is concerned, its influence on the preciseness of the results depends, first, on the numbers of the population of the territory for which this indicator or the other has to be obtained and, second, on the magnitudes of the indicators separable during development. It has been established that an acceptable level of accuracy of the majority of sample data is achieved with a sample volume of 100,000 persons. This means that with a sampling proportion equal to 25 percent sufficiently representative data may be obtained for a territory with a population of approximately 400,000. Whence it follows that the minimum administrative unit for obtaining sufficiently reliable and representative sample data may be an oblast, kray or autonomous republic.* Furthermore, the reliability of the results is insured simultaneously for a number of aspects with this sampling volume.

It should be emphasized that the basic task of the census, as of a statistical inquiry into the population in general, is to obtain data reflecting regularity in its distribution as per this tag or the other, that is, in the composition of the population of this territory or the other. The census results characterize this regularity if they reflect a mass phenomenon, that is, embrace a sufficiently large number of instances. The larger the number of inquiries, the greater the confidence that the correlations of the magnitudes actually observed are not random but reflect reality. If, for example, on a certain territory the census recorded three miners, these data are insufficiently informative for a study of the occupational composition of the population: either the sample is too small or these people were here incidentally. Nor are these data of great practical significance: by the time the development of the census material is completed, one of these three may have left, another may have changed his occupation and the third may have retired. Such contingencies limit the authenticity not only of sample but also of complete data. It is for precisely this reason that in any statistical inquiry limits are set on the context of the development and subdivision of the obtained groupings: they must be such as to insure that the indicator embrace a sufficiently large number of instances.

Thus the proportion of the sample and the corresponding sample volume adopted in the census insured observance of the provisions of sample-method theory and at the same time afforded an opportunity for obtaining information satisfying practical needs.

However, the problem of employing the sample method in a census is not confined to the elaboration of a sufficiently stringent and comparatively simple sampling method and determination of the proper sample volume.

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*In the oblasts and ASSR's whose population strength is below the specified limit a complete census was conducted in accordance with the full program.

Insofar as the sample data cover approximately one-fourth of the population it is necessary to amplify them for the whole population, that is, estimate from the value of each sample indicator the unknown value of the corresponding indicator for the entire population of a given territory. This has to be done for a comparatively large number of indicators: it is sufficient to say that tables of the sample census account for approximately one-third of the tables and indicators (not counting a breakdown by area) in the development program. Some of the problems of this estimation are examined in greater detail below.

General Principle of the Amplification of the Census' Sample Data

The task of amplification is to estimate most accurately from the sample indicators the unknown values of the corresponding indicators for the entire population, insuring here the concordance of the complete and amplified sample data.

To illustrate let us examine a simplified example. Let us assume that during the census 25 percent of 10,000 people have been selected, that is, 2,500 people, who are distributed in social groups and nationalities as shown in Table 1.* The "Entire population" line of Table 1 shows the data of the complete census.

Table 1

Social group/Nationality	Russian	Other na- tionalities	All national- ities (line totals)
Workers	450	300	750
Other social groups	650	1,100	1,750
All social groups (column totals)	1,100	1,400	2,500
Entire population	4,000	6,000	10,000
Coefficient of reduction	3.64	4.29	4.00

It is simplest of all to determine from the results of the sample census the corresponding data for the entire population by multiplying all the numbers (elements) in the table with the tag of the sample census by a magnitude inverse to the proportion of the sample, that is, by 1 : 0.25 = 4. This magnitude we shall call the coefficient of reduction, the tables obtained by multiplying the elements of the tables of the sample census by the coefficients of reduction reduced tables and the calculation process itself reduction.

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*The subject and predicate of the tables are only allocated two groups in the example for simplification of the calculations, although actually there are usually more of them in the development program.

However, with a unified coefficient of reduction a contradiction arises between the reduced data and the results of the complete census. This is illustrated in Table 2, the elements of which are obtained by multiplying the elements of the first three lines of Table 1 by the unified common coefficient of reduction equal to 4.

Table 2

Social group/Nationality	Russian	Other nationalities	All nationalities (Line totals)
Workers	1,800	1,200	3,000
Other social groups	2,600	4,400	7,000
All social groups (column totals)	4,400	5,600	10,000

In can be seen from a comparison of Table 2 (the "All social Groups" line) and Table 1 (the "Entire population" line), that, given the same approach, the total numbers of persons of the two groups by nationality (4,400 and 5,600) do not correspond to the data of the complete census (4,000 and 6,000).

Insofar as for each of these groups of nationalities there are both complete and sample census data it is possible to take not one common but two individual coefficients of reduction (they are indicated in the last line of Table 1) and to obtain precise column totals for the reduced Table 3.

Table 3

Social groups/Nationality	Russian	Other nationalities	All nationalities (Line totals)
Workers	1,637	1,285	2,922
Other social groups	2,363	4,715	7,078
All social groups (Column totals)	4,000	6,000	10,000

The "All social groups" line in Table 3 now coincides with the "Entire population" line in Table 1 for data of the compete census.

However, a new complication arises at this stage. Let us assume that another table containing a combination of the same tag of the sample census (social group), but a different tag of the complete census (age) has to be obtained --Table 4. The coefficients of reduction here will be different (they are indicated in the last line).

Table 4

Social group/Age	Under 40	40 and over	All ages (Line totals)
Workers	500	250	750
Other social groups	650	1,100	1,750
All social groups (column totals)	1,150	1,350	2,500
Entire population	5,000	5,000	10,000
Coefficients of reduction	4.35	3.70	4.00

If they are applied to the elements of Table 4, the corresponding reduced table will have the appearance of Table 5 (tables for which the column or line totals should coincide we will call conjugate: Table 3 and Table 5 are conjugate tables).

Table 5

Social group/Age	Under 40	40 and over	All ages (Line totals)
Workers	2,174	926	3,100
Other social groups	2,826	4,074	6,900
All social groups (column totals)	5,000	5,000	10,000

In Table 5 the column totals, that is, the total numbers of persons of a given age (the "All social groups" line) concur with the data of the complete census (the "Entire population" line, Table 4), but the line totals, that is, the total numbers of persons of each social group differ from the corresponding data of Table 3, which is conjugate therewith. Table 3 has a figure of 2,922 for workers and 7,078 for other social groups, but Table 5 has the figures 3,100 and 6,900 respectively. Since the "social group" tag has only been recorded in sample fashion, the total numbers of persons with respect to social group for tables 3 and 5 are unknown.

Which, then, of the pairs of numbers obtained are closer to the real ones? And how to insure the concurrence of these numbers in both tables?

Statistically, the average of the line totals in the conjugate tables 3 and 5 will be the best estimates of these numbers:

| Workers | (2,922 + 3,100) : 2 = 3,011 |
| Other social groups | (7,078 + 6,900) : 2 = 6,989 |

But if these average totals are taken as the line totals for both conjugate tables, the sums of the line elements will not be equal to these totals either in Table 3 or in Table 5. For this reason it is necessary to correct the elements of Table 3 such that the sum of the adjustments for elements of the first line equals 3,011 - 2,922 = 89, and the sum of the adjustments for elements of the second line equals 6,989 - 7,078 = -89. However, the sums of the column elements must not change here. An analogous correction must be made for Table 5 also. We would recall that it is not actual data which are being corrected here but the estimates of the corresponding indicators for the entire population obtained by the method described in order to increase their accuracy.

Having made the stated correction, we obtain the final amplified data. They are more precise than the initial estimates, match each other in the different tables and correspond to the totals of the complete census.

Thus the process of amplifying sample data in the formulation in question consists of two stages:

1. Reduction of the tables in accordance with individual coefficients of reduction.

2. Correction of the elements of the reduced congjugate tables.

The work sequence for the first stage is clear from the foregoing exposition. The second stage of the calcuation--correction of the elements of the reduced tables--is performed by the quadratic programming method. The interconnected nature of the tables leads to the needs to introduce linear equality constraints for the sums of the line and column elements of the tables. For the purpose of computing these constraints and also inequality constraints for individual elements of the tables a special algorithm of correction of the tables was developed for the 1979 census which also takes account of other peculiarities of the census materials. These peculiarities, which are determined by the interconnection of the tables, presuppose a definite sequence of the computing process, the use of tabular aggregation and disaggregation procedures, the need for the construction and amplification of differential tables and also a certain hierarchy of the transition from the lowest administrative units to the highest.

Correction of Elements of the Reduced Conjugate Tables

It was mentioned earlier that in the reduced tables the sums of the line elements are not equal to the averaged totals. After reducing the sample data and finding the vectors of the line and column totals of each table, it is necessary to correct the elements of each table such that the sums of the line and column elements correspond to these totals.

The practice of calculations has shown that the elements of the reduced tables provide a good initial approximation to the true values of the corresponding elements of the tables. Therefore the task of correcting the elements of the reduced tables consists of finding a table close to the reduced table in which the condition of the equality of the sums of the line and column elements with the components of the vectors of the totals obtained in the process of reducing and averaging the corresponding magnitudes for a group of conjugate tables is observed.

We shall designate Δ_{ij} the magnitude by which the element i of the line of the j column of the table is corrected. The correction should then be effected upon the premise:
$$\sum_{j=1}^{m} \Delta_{ij} = \Delta_{i0} \qquad i = 1, 2, \ldots n,$$

$$\sum_{i=1}^{n} \Delta_{ij} = \Delta_{0j} \qquad j = 1, 2, \ldots, m, \tag{1}$$

where Δ_{i0} is the difference between the j component of the vector of conjugate tables which are the average for the group and the sum of the elements of the reduced table for the i line;

Δ_{0j} is the difference between the i component of the vector of the totals of the complete census and the sum of the elements of the reduced table for the j column;

m is the number of columns in the table; and

n is the number of lines in the table.

The minimum weighed sum of the squares of the correction (Δ_{ij}) is taken as the criterion of the proximity of the two tables, that is,

$$S = \min_{ij} \sum a_{ij}\Delta_{ij}^2, \qquad (2)$$

where the indices i, j under the symbol Σ indicate that the summation is performed for all of $i = 1, 2\ldots n$ and $j = 1, 2\ldots m$, while the weight coefficients a_{ij} make it possible to take into consideration in the correction possible errors of the elements (i, j) of the reduced table. The permissible magnitudes of the corrections must satisfy a certain system of constraints. Thus, for example, it is obvious that the amplified values of the tabular elements must not be less than the corresponding sample values. This constraint could be of appreciable importance for comparatively small tabular elements.

If we designate Δ_{ij}^{π} and Δ_{ij}^{Π} the left and right limits of possible correction of the element (i, j), the following inequalities are realized:

$$\sum_j \Delta_{ij}^{\pi} > |\Delta_{i0}| \quad \text{при } \overline{\Delta_{i0} < 0}; \qquad i = 1, 2, \ldots, n,$$

$$(3)$$

$$\sum_j \Delta_{ij}^{\pi} > \Delta_{i0} \qquad \text{при } \Delta_{i0} > 0; \qquad i = 1, 2, \ldots, n.$$

These premises determine the constraints from below for the corresponding sums of the left and right limits of the corrections. It is also possible to determine approximately the limits on the magnitudes of the errors of the elements if it is accepted that these limits are proportional to the discrepancies in the lines obtained as a result of reducing and averaging and the relative error of a given element.

Then $$\Delta_{ij}^{\pi\Pi} = K \cdot \frac{\sigma_{ij}}{\sum_j \sigma_{ij}} |\Delta_{i0}|. \qquad (4)$$

where σ_{ij} is the degree of error of the i, j tabular element;

K is the coefficient of proportionality; and

$\Delta_{ij}^{\pi\Pi}$ is the absolute magnitude of the left and right limits of the corrections of the elements.

Since in accordance with formula (4) $\sum_j \Delta_{ij}^{an} = K\Delta_{io}$, to satisfy the constraints formulated above the magnitude K must be greater than one.

This problem of the correction of elements of the reduced table is solved by quadratic programming methods, where Δ_{ij} are found which supply the minimum in the expression (2) upon realization of the system of the linear equalities of expression (1) and the inequalities limiting a possible change in tabular elements

$$-\Delta_{ij}^a < \Delta_{ij} < \Delta_{ij}^n \quad \text{при} \quad \begin{aligned} i &= 1, 2, \ldots, n, \\ j &= 1, 2, \ldots, m. \end{aligned} \tag{5}$$

Since the coefficient a_{ij} in formula (2) must reflect a possible change in the corresponding elements, it is possible to apply for them

$$a_{ij} \cong \frac{1}{[\max(\Delta_{ij}^a, \Delta_{ij}^n)]^p}. \tag{6}$$

This problem has been solved for the specific conditions of a population census and certain similar economic tasks.* The method of solution presupposes two stages: at the first stage a final solution is provided of the problem of minimizing the sum of squares of the corrections upon realization of the system of linear constrants of (1), but without the obligatory realization of the entire system of inequalities of (5). Realization of the condtions of (5) is achieved at the second stage by the step method, and, moreover, an analytical formula is provided of a change in the coefficient a_{ij} (corresponding to the element deviating from the limits to the greatest magnitude) whereby the magnitude of this element proves to be within the limits set for a given element. The choice of formula (6) to determine the initial values of the coefficients a_{ij} makes it possible to find a_{ij} right at the first step the values of corrections the overwhelming majority of which satisfy the conditions of (5).

The accuracy of the results of the correction depends on whether all the possible premises have been taken into consideration in the calculation. In particular, when it is possible to make a correction not for the whole table but for its naturally separable parts (separately for the employed or unemployed population, say), it is advisable to do this inasmuch as it is possible to insert the corresponding constraints for each of the parts. More precise constraints on the elements lead to the greater precision of the entire correction.
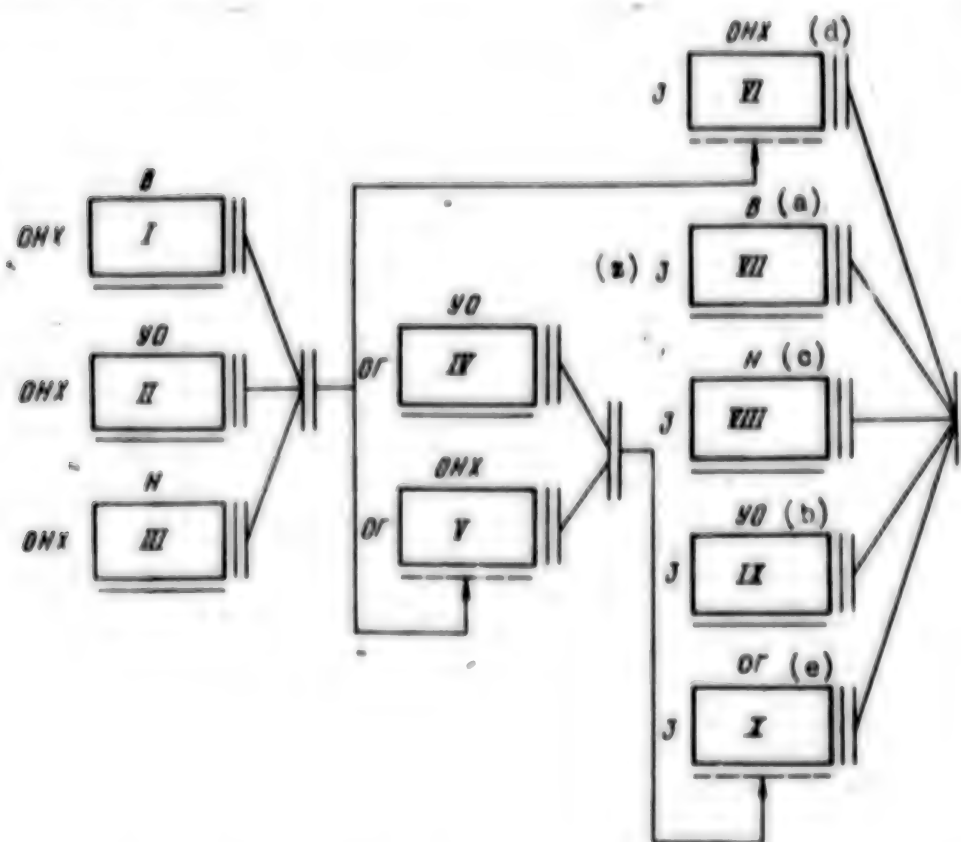
Processing Sequence

As is known, the program of developing the population census consists of a number of groups of conjugated tables. This particular feature of it

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*For more detail see A. L. Raykh, "The Step Method of Balancing Arrays of Interconnected Economic Indicators," EKONOMIKA I MATEMATICHESKIYE METODY No 2, 1977.

engenders the need for a certain sequence of obtaining the summary data. A representative fragment of the development program illustrating this sequence is shown in a schematic drawing (see diagram). The rectangles denote the tables, and the letters of the tags in the subject and predicate of the table. A single unbroken line beneath a rectangle denotes the totals of the complete census (they are, naturally, identical for all tables with a like tag), a double line denotes the averaged totals of the reduced tables of the sample census and a broken line denotes transferred averaged totals. Combinations of double lines with broken lines show which averaged results are transferred and whither.

Fragment of the Development Program Illustrating the Sequence of the Amplification of Sample Data

Key:

a. Age b. Level of education c. Nationality d. Sectors of the national economy e. Social groups z. Occupations I-X. Conventional numbers of the tables.

For example, of the two conjugate tables IV and V--"Distribution of the Employed Population per Social Group and Level of Education" and "Distribution of the Employed Population per National Economy Sector and Social Group"--only the "Social Group" tag was obtained by sampling means in

Table IV, whereas both "Sector of the National Economy" and "Social Group" tags were obtained by sampling means in Table V. At the same time the "Sector of the National Economy" tag is incorporated as the subject in another group of conjugate tables, in which it is combined with age (Table 1), level of education (Table 2) and nationality (Table 3).

Thus amplification of the above tables should begin with tables I, II and III. The vector of the line totals (total numbers of those employed per sector of the national economy) which has been determined for these reduced tables is subsequently employed as the vector of the column totals for Table V.

The further procedure of reducing the conjugate tables IV and V and determining the average of the line totals (that is, from the total numbers of those employed per social groups) is realized in the same sequence, and, moreover, the transferred vector of the average of the totals of tables I, II and III is used as the "All social groups" line in Table V.

An analogous sequence of computations is also necessary for reducing the group of conjugate tables VI-X, where the subject contains the sample tag --occupation. In tables VII, VIII and IX the predicate is the tag of the complete census (age, nationality and level of education respectively). The corresponding reduced and averaged vector-totals of the conjugate tables IV and V and tables I, II and III should be taken as the total for sectors of the national economy and social groups in the subject in tables VI and X (distribution of the population per occupation and sector of the national economy and per occupation and social group). After this, the reduction of all five tables of this group and the computation of the averaged vector of the totals for occupation are possible. The same method is also employed for other conjugate tables of the sample census.

Aggregation of Data

In the description of the procedure of reducing and computing the averaged vector of the line totals of tables I, II and III there was no mention of the fact that tables I and II contain data on sectors of the national economy and types of production, whereas only aggregated data on sectors of the national economy is used in Table III. It is obvious that it is necessary to aggregate the data of tables I and II before averaging the totals of these three tables, that is, prior to reducing the sample data, to summarize them for the individual forms of production which are part of one and the same sector of the national economy. Only after this are the sample data reduced and the line totals averaged and transferred to tables V and VI.

Disaggregation of Data

As a result of the preceding stage of computations amplified numbers were obtained of those employed in sectors of the national economy for the three aggregated tables I, II and III. These numbers, however, provide only the

sums of the numbers of those employed in the individual types of production which are a part of the given sector of the national economy. For this reason we have to turn again to tables I and II to disaggregate their totals for the sectors into totals for individual types of production.

As an example, let us examine the transportation sector of the national economy. Let us assume that in tables I and II this sector has been subdivided into the following "types of production" or subsectors: 1--railroad transport, 2--water transport, 3--motor vehicle transport, 4--urban electric transport and so forth--seven types of transport altogether. We then have for this sector two elementary conjugate tables, as it were: distribution of those employed per type of transport and age (part of Table I) and distribution of those employed per type of transport and level of education (part of Table II). The corresponding two lines of the final data of the preceding stage of amplification per sector from tables I and II (in this case for the "Transportation" sector) provide the column totals for these two conjugate elementary tables (that is, the distribution of those employed in transportation per age from Table I and per level of education from Table II). The elementary tables of sample data for types of transport (the above-mentioned parts of tables I and II) are reduced from these totals. The corresponding average totals from the line totals of these reduced tables will be taken as the averaged totals for these two elementary conjugate tables. An analogous procedure of reducing and determining average results is applied for those conjugate tables in one of which the classification for the given tag is less detailed than in others.

The aggregation and disaggregation method in the amplification of sample data is also applied to reduce the time of computer calculation for tables of a very large dimensionality, particularly for tables where one of the tags is "Occupation." The classification of occupations for the population census covers more than 250 denominations. For this reason the sample data for aggregated groups of occupations is amplified initially, and then the intermediate totals which have been obtained are used for disaggregating and amplifying sample data for individual occupations within these groups. The aggregation and disaggregation method permits an appreciable economizing on resources in this case.

Hierarchy of Calculation Procedure

The lowest administrative unit for which sample data of the 1979 population census is amplified in absolute data is the oblast. Amplified data for higher territorial units (republic, USSR) may be obtained by a summation of the elements of the corresponding tables for oblasts. This procedure is possible for all tables except those where one of the tags of the grouping is nationality inasmuch as the lists of selected nationalities for which these tables are constructed do not coincide in different union republics.

Tables containing a distribution of persons of individual nationalities, in employment, per sector of the national economy and per occupation (that

26

is, per tags of the sample census, require a special approach. The development program provides for the compilation of these tables for the most populous nationalities for each union republic and oblast. For example, for the USSR the development program selects from two nationalities (Voronezhskaya Oblast) to 16 (the Dagestanskaya ASSR), whereas more than 40 nationalities are selected for the RSFSR as a whole. The lists of the nationalities selected for these tables for the union republics also do not coincide and do not correspond to the list for the USSR as a whole. Whence it follows that a direct summation of the results of the amplification of these tables is impossible. To obtain consolidated data for a republic or the USSR it is possible to amplify data for all oblasts for the complete list of nationalities and make a summation for the republic and then aggregate the nationalities not selected in the processing in each oblast in the "other nationalities" group. Then, for example, it would be necessary for the RSFSR to amplify data for 70 oblasts, krays and ASSR's with a list of nationalities 10 times greater than that selected for development. In other words, 90 percent of the information for each oblast would then have to be aggregated. With this approach amplification of the above data would require appeciably more machine time.

In this connection the following more economical procedure of summarizing oblast data for the republic and republic data for the USSR as a whole may be suggested for tables containing population distribution per sector of the national economy and also per nationality and occupation. It consists of the following:

1. For nationalities selected both at oblast level and at republic and USSR level the corresponding table is amplified at oblast level and then transferred to republic and USSR level for summation.

2. For nationalities selected at oblast level but not selected at republic level the corresponding table is amplified at oblast level, and upon summation for the republic the amplified data (for all the oblasts where the given nationality has been selected) are incorporated in the "other nationalities" group.

3. For nationalities not selected at a given oblast level but selected at republic level (and in other oblasts) a single supplementary table of sample data is formed for this oblast. For each oblast this supplementary table incorporates all nationalities selected in the republic and the USSR. The supplementary table will be consolidated for the republic and amplified at republic level.

Thus for the nationalities indicated in point 3 the republic totals are formed from the data for the oblasts where the corresponding nationality has been selected at oblast level (point 1) and the data of the supplementary table for all oblasts where it has not been selected at oblast level. For a given oblast the nationalities selected in the supplementary table are incorporated in the "other nationalities" group.

There is also a corresponding breakdown for all totals needed for reduction and correction.

Official Acceptance of the Method of Amplifying Sample Data of the Population Census

The method of amplification with the use as tabular totals of sample data of information of high accuracy extrinsic to the table diminishes the dispersion of error, that is, increases the statistical accuracy of the amplification of the sample data. For this reason the dispersion of error of a simple random sample provides an estimate from above for the magnitude of the dispersion in question.

A comparison of the results of the amplification of the sample data with the complete data for the material of the 1976 trial census was made to assess the extent of the increase in accuracy with this sampling method and the new method of amplifying sample data of the population census. The comparison showed that the discrepancy between the amplified and complete data does not exceed the theoretically permissible limits. In addition, it turned out that the confidence limits of these discrepancies with a confidence probability of $p = 0.95$ could be narrowed by no less than 20 percent. It is important to emphasize that the marked increase in accuracy occasioned by the use of a more refined algorithm is achieved with little computer time spent on amplifying the sample data.

Summing up what has been said, it may be concluded that the method of amplifying the sample data formulated in the USSR Central Statistical Administration Scientific Research Institute and applied in the 1979 All-Union Population Census provides for:

1) the acquisition of amplified data corresponding, on the whole, to the complete data of the census;

2) the acquisition of reliable data on the composition of the population from the tags incorporated in the sample census; and

3) an increase in the accuracy of the data compared with other methods of amplification.

Furthermore, it proved reasonably economical.

All this is reason to recommend the applied method for further censuses and surveys. Taking into consideration its efficiency, it will be possible in subsequent censuses, in our view, to considerably increase the number of questions in the sample part of the census program.

The stated method of amplifying sample data (correction of elements of the reduced conjugate tables, aggregation and disaggregation of the data and also the sequence of computations and so forth) was implemented in the

development of the material of the 1979 All-Union Population Census. The successful application of this method proved possible thanks to the great deal of work carried out by the USSR Central Statistical Administration's All-Union Population Census Administration and the USSR Central Statistical Administration's Central Computer Center.

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